



## UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/528,389	03/18/2005	Kazutomo Hoshino	8097-1004	7028
466	7590	07/29/2008	EXAMINER	
YOUNG & THOMPSON			KACKAR, RAM N	
209 Madison Street			ART UNIT	PAPER NUMBER
Suite 500				1792
ALEXANDRIA, VA 22314			MAIL DATE	DELIVERY MODE
			07/29/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/528,389	<b>Applicant(s)</b> HOSHINO ET AL.
	<b>Examiner</b> Ram N. Kackar	<b>Art Unit</b> 1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(o).

#### Status

- 1) Responsive to communication(s) filed on 07 February 2008.  
 2a) This action is FINAL.      2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-22 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-22 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_
- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date \_\_\_\_\_  
 5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_

**DETAILED ACTION**

**This supplemental office action is in response to miscellaneous incoming letter dated**

**2/7/2008.**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 7-8 and 10-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In these claims the standards used for assessing wear resistance and thermal shock resistance do not appear to be known universally and not explained adequately in the specification so as to make their scope indefinite.

Regarding the term "Sa" (Central surface average roughness) as used here it is not clear if it is another way of expressing roughness or it just refers to roughness of central surface. The specification does not address this adequately.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless —

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**3. Claims 1-2, 4-5 and 7-8 rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yasuda et al (US 5955182).**

Yasuda et al disclose a heat resisting member capable of being used at very high temperature discloses a ceramic layer which could have top layer of zirconia and intermediate layer of alumina so that the roughness could  $R_a \geq 7.5 \mu\text{m}$ ,  $R_z \geq 55 \mu\text{m}$  and  $R_y \geq 80 \mu\text{m}$ . Yasuda further teaches that it is sufficient to describe the roughness only by one way (See for example Abstract, Col % lines 44-55 and Col 10 lines 35-46).

Further  $R_{sk}$  and  $R_{ku}$  are statistically calculated from above type of roughness parameters and therefore should be inherently same.

***Claim Rejections - 35 USC § 103***

**4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:**

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**5. Claims 1-9 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi Noriyaki et al (JP 2002-128583).**

Takahashi et al teach a jig for calcining an electronic component comprising a substrate and a zirconia surface layer formed on the substrate and having an arithmetic average roughness "Ra" from 10 to 40  $\mu\text{m}$  (Page 2, Paragraph 0005).

Takahashi et al teach, an intermediate layer formed on the substrate and a zirconia surface layer formed on the intermediate layer (alumina) or directly and having an arithmetic average roughness "Ra" from 10 to 40  $\mu\text{m}$  (Page 2, Paragraph 0008, Page 2, Paragraph 0016),

Further Takahashi et al teach that zirconia surface layer includes from 50 to 70 % in weight of coarse particle aggregate having from 100-200 mesh and 30 to 55 % in weight of fine particle bond phase having an average particle size from 3-5  $\mu\text{m}$  (See table 1 and its description in the machine translation).

Further Takahashi et al disclose the same problems and disclose the solution in precisely same way (See for example Paras 5 and 6).

**6. Claims 1, 2, 4, 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toshiya Kishimoto (JP 2002-060277).**

Toshiya Kishimoto teach a jig for calcining an electronic component comprising a substrate and a zirconia surface layer formed on the substrate and having an arithmetic average roughness "Ra" from 15 to 44  $\mu\text{m}$  (Abstract, Page 2,3,4, Paragraph 0006, 0011, 0014).

**7. Claims 1-16 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi Noriyaki et al (JP 2002-128583) in view of Yasuda et al (US 5955182).**

Takahashi Noriyaki et al as discussed above do not disclose wear resistance thermal shock resistance, relative density of zirconia layer,

Yasuda et al disclose a heat resisting member capable of being used at very high temperature discloses a ceramic layer which could have top layer of zirconia and intermediate

layer of alumina so that the roughness could  $R_a >= 7.5 \mu\text{m}$ ,  $R_z >= 55 \mu\text{m}$  and  $R_y >= 80 \mu\text{m}$ .

Yasuda further teaches that it is sufficient to describe the roughness only by one way (See for example Abstract, Col % lines 44-55 and Col 10 lines 35-46).

Yasuda et al disclose relative densities of top zirconia layer and intermediate layer which could be alumina. Yasuda et al teach that relative density is correlated to elastic modulus and teach the relative density of intermediate layer has high relative density, high hardness and high elastic modulus which could 88 % or more while the zirconia layer could have a density lower than 88 % (In some examples they disclose density of 70% (See for example Abstract, Col 5 lines 37-61 and Examples 1-9 in columns 13-20). Yasuda et al further teach that the total thickness of these layers could be 100-3000  $\mu\text{m}$ . Further, Yasuda teach that the Zirconia layer has high thermal shock resistance and high abrasion resistance (Abstract).

Yasuda et al do not disclose actual measure of thermal shock resistance and wear resistance but disclose hardness and elastic modulus, by other way of measurement. However since the disclosed member is designed to work in high temperature environment (more than 1000 degrees), has similar roughness parameter, is made the same way with similar materials it is obvious to have the same thermal shock resistance and wear resistance.

Further  $R_{sk}$  and  $R_{ku}$  are statistically calculated from above type of roughness parameters as disclosed. It is known that  $R_{sk}$  (skewness) parameter determines asymmetry and in practical sense determines area of contact of an object when placed on the surface and  $R_{ku}$  (Kurtosis) determines "peakedness" which affects wear resistance.

Regarding the term "Sa" it is assumed to be correlated to  $R_a$ .

There fore it would have been obvious to one of ordinary skill in the art at the time of invention to optimize thermal shock resistance and wear resistance to claimed degree.

**8. Claims 12, 17 and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi Noriyaki et al (JP 2002-128583) in view of Yasuda et al (US 5955182) as applied to claims 1-16 and 18-20 and further in view of Takeuchi et al (US 20020041131).**

Takahashi Noriyaki et al in view of Yasuda et al do not disclose metal oxide sintering aid for zirconia layer and alumina intermediate layer.

However metal oxide sintering aid is well known for sintering ceramic materials as taught by Takeuchi et al who disclose metal oxides including magnesia, clay, silica as sintering aids for zirconia and alumina (See for example paragraph 17, 6 and 8).

Therefore using metal oxide as sintering aid would have been obvious to one of ordinary skill in the art at the time of invention.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Pub 2003/0135191 to Price et al and 2003/0219621 teach correlation among three roughness and statistical parameters like skewness and kurtosis.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N. Kackar whose telephone number is 571 272 1436. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

Art Unit: 1792

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571 272 1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ram N Kackar/  
Primary Examiner, Art Unit 1792